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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/865,659	05/25/2001	Anthony J. Calise	3394/34267	7770

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EXAMINER

BOOKER, KELVIN E

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 06/30/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/865,659

Applicant(s)

CALISE ET AL.

Examiner

Kelvin E Booker

Art Unit

2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-15 and 17-19 is/are allowed.
- 6) ☒ Claim(s) 1-7, 16 and 20-30 is/are rejected.
- 7) ☒ Claim(s) 16, 23 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5.6.7.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☒ Other: Detail Office Action.

DETAILED ACTION

Claim Objections

1. **Claims 16, 23 and 24** are objected to because of the following informalities: The claims are directed at functional relationships whereby the elements of the functions are not disclosed in the claims [e.g., $N_{ad}(S)/D_{dc}(S)$, $N_{dc}(S)/D_{dc}(S)$]. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 1-7** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase “*other sensed variables affecting the state of the plant*” in **claim one** is a relative phrase that renders the claim indefinite. The above mentioned phrase is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The claim provides for the use of an adaptive control system (ACS) which generate a control signal to regulate a plant's output respective of indefinite/undefined variables which affect functioning of the plant, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim

is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 1-7, 16, 20-30** are rejected under 35 U.S.C. 101 because the invention as disclosed, is directed to non-statutory subject matter. While the claims are in the technological arts, they are not limited to practical applications in the technological arts.

Claims one and 16 focus on an adaptive control system (ACS) and linear controller, respectively, which function to generate a control signal to regulate a plant's output, however the claims fail to define a statutory specific machine or system. A machine or manufacture or system claim may be one of two types: (1) a claim that encompasses any and every machine for performing the underlying process or any and every manufacture that can cause a computer to perform the underlying process, or (2) a claim that defines a specific machine or manufacture. When a claim is of the first type, Office personnel are to evaluate the underlying process the computer will perform in order to determine the patentability of the product.

The mere fact that a hardware element is recited in the claim does not necessarily limit the claim to a specific machine or manufacture. If a product claim encompasses any and every computer implementation of a process, when read in light of the specification, it should be examined on the basis of the underlying process. Such a claim can be recognized, as it will

define the physical characteristics of a computer or computer component exclusively as functions or steps to be performed on or by a computer, and encompass any and every product in the stated class, configured in any manner to perform the process.

Claims that define a computer related invention as a specific machine or specific article of manufacture must define the physical structure of the machine or manufacture in terms of its hardware or hardware and "specific software." The applicant may define the physical structure of a programmed computer or its hardware or software components in any manner that can be clearly understood by a person skilled in the relevant art. Generally a claim drawn to a particular programmed computer should identify the elements of the computer and indicate how those elements are configured in either hardware or a combination of hardware and specific software.

Claims 20, 23 and 24 focus on a series of steps to be performed on a computer, but the ideas are disclosed abstractly from any particular practical application. The claims are directed at performing the specific tasks of transferring functions and generating signals, but fail to provide a method in which the steps of a process is presented whereby the subject matter is acted upon to produce a result.

To constitutionally interpret the word "process", the Supreme Court has held that: "***A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing. ***The Process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be a secondary consequence."(emphasis added) *Diamond, Commission of Patents and Trademarks v. Diehr and Lutton*, 209 USPQ 1, 6 (1981) quoting *Cochrane v. Deener*, 94 U.S. 780, 787-788 (1876).

This Constitutional interpretation of the word “process” is a long-standing one that the Supreme Court requires to be applied in interpreting 35 USC 101. *Diamond v. Diehr* at 6. Consequently, the use of that interpretation is Constitutionally required when we interpret the Federal Circuit’s standard that a “new and useful process” is one that produces a useful, concrete, and tangible result”. Cf. *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 47 USPQ2d 1596, 1600-1601 (Fed. Cir. 1998).

Further, claims 20, 23, 24 and 29 are directed at general methods for performing individual tasks without disclosing any computer implemented processing. Abstract ideas (see *Warmerdam*, 33 F.3d at 1360, 31 USPQ2d at 1759) or the mere manipulation of abstract ideas (see *Schrader*, 22 F.3d at 292-93, 30 USPQ2d at 1457-58) are not patentable.

As disclosed, independent **Claims 20, 23, 24 and 29** focus on nonfunctional descriptive material, which is inclusive of the mere arrangement of data without engaging functionality when employed as a computer component.

Applicant discloses no “certain substances” that have been “transformed or reduced” in that applicant’s claims disclose no specific computer-readable medium, no manipulation of specific data representing physical objects or activities (pre-computer activity), nor do they disclose any specific independent physical acts being performed by the invention (post-computer activity).

The claims merely manipulate abstract ideas in general without limitation to a practical application where “certain substances” are transformed or reduced.

Claims 2-7, 21, 22, 25-28 and 30 do not cure the defect in the **claims 1, 20, 23, 24 and 29**. On this basis, **claims 1-7, 16 and 20-30** are rejected under 35 USC 101.

Allowable Subject Matter

6. **Claims 8-15 and 17-19** are allowed.

7. The following is a statement of reasons for the indication of allowable subject matter:

the cited prior art fails to explicitly teach of an adaptive control system (ACS) for controlling a plant consistent with the system elements and associated functional relationships disclosed in **independent claims 8 and 17**, wherein the ACS employs an active neural network adaptive element to map the plant output signal and pseudo-control signal to an adaptive control signal, and in-turn, mapping the adaptive control signal with a weighted training signal to further bound the control output.

Conclusion

8. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- A. Selmic et al., U.S. Patent No. 6,611,823;
- B. Werbos, U.S. Patent No. 6,532,454;
- C. Rabinowitz, U.S. Patent No. 6,351,740;
- D. Horn et al., U.S. Patent No. 6,085,183;
- E. Jagannathan et al., U.S. Patent No. 6,064,997;

- F. Smith, U.S. Patent No. 5,796,922;
- G. Hyland, U.S. Patent No. 5,796,920;
- H. Hyland, U.S. Patent No. 5,680,513;
- I. Isik et al., U.S. Patent No. 5,586,221;
- J. Huang et al., U.S. Patent No. 5,493,631;
- K. Bozich et al., U.S. Patent No. 5,426,720;
- L. Bozich et al., U.S. Patent No. 5,367,612;
- M. Skeirik, U.S. Patent No. 5,224,203;
- N. Skeirik, U.S. Patent No. 5,197,114;
- O. Skeirik, U.S. Patent No. 5,167,009;
- P. Skeirik, U.S. Patent No. 5,142,612;
- Q. Skeirik, U.S. Patent No. 5,121,467;
- R. Chen et al., "Adaptive Control of a Class of Nonlinear Systems Using Neural Networks";
- S. McFarland et al., "Robustness Analysis For a Neural Network Based Adaptive Control Scheme";
- T. Calise et al., "Design of Optimal Output Feedback Compensators in Two-Time Scale Systems";
- U. Moerder et al., "Near-Optimal Output Feedback Regulation of Ill-Conditioned Linear Systems";
- V. Rysdyk et al., "Robust Adaptive Nonlinear Flight Control Applications Using Neural Networks";

W. McFarland et al., "Robust Adaptive Control Using Single-Hidden-Layer Feedforward Neural Networks";

X. Hovakimyan et al., "Dynamic Neural Networks for Output Feedback Control";

Y. Calise et al., "An SPR Approach for Adaptive Output Feedback Control with Neural Networks";

Z. Brdys et al., "Recurrent Networks for Nonlinear Adaptive Control";

AA. Widrow et al., "Adaptive Inverse Control Based On Linear and Nonlinear Adaptive Filtering";

BB. Chen et al., "Adaptive Control of a Class of Nonlinear Discrete-Time Systems Using Neural Networks";

CC. Hussain et al., "Nonlinear Control With Linearised Models and Neural Networks";
and

DD. Yamada et al., "Remarks on an Adaptive Self-Tuning Controller Using Neural Networks".

9. An inquiry concerning this communication or earlier communications from the examiner should be directed to Kelvin Booker whose telephone number is (703) 308-4088. The examiner can normally be reached on Monday-Friday from 7:00 AM-5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight, can be reached on (703) 308-3179. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

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An inquiry of a general nature or relating to the status of this application proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.



Anthony Knight
Supervisory Patent Examiner
Group 3600

K.E.B.

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June 9, 2004